

## REMARKS

Claims 1–61 are pending in the present application. Claims 1–61 have been rejected under § 102(e) as being anticipated by, or, in the alternative, under § 103 as being unpatentable over Pahlman et al. (US 6,579,507) (Pahlman). Claims 7–10, 15–16, 23–25, 33–35, 39–41, 49–51, and 59–61 have been rejected under § 103 as being unpatentable over Pahlman and further in view of Johnson et al. (US 5,480,619) (Johnson). Claims 4–6 have been rejected under § 103 as being unpatentable over Pahlman and further in view of deJong et al. (US 4,196,173) (deJong).

Applicants believe that Pahlman does not teach or suggest the amended claims. Pahlman discloses the use of an acid-washing step in the regeneration of a metal oxide sorbent for the purpose of dissolving contaminant salts collected on the sorbent. Halide acids are not specified in Pahlman. No particular acid is specified in the claims of Pahlman, although nitric acid is used in the examples, since it forms soluble nitrate salts, not only of the mercury, but also of the manganese sorbent material that has combined with sulfate formed during exposure to the flue gas. Since nitric acid works very well for Pahlman's application, there is no motivation to use a somewhat more expensive and potentially more corrosive halogen-based acid. Pahlman's method further necessitated the recovery of the manganese by precipitation and calcining.

The applicants disclosure teaches the use of an acid, comprising, for example, a hydrohalide acid or a halide salt solution. For example, independent claims 1 and 56 recite the use of a "halide salt," independent claim 27 recites the use of a "hydrohalide," independent claim 37 recites "exposing the sorbent to a promoter selected from the group consisting of hydrohalides, metalhalides, halogens, and combinations thereof," independent claim 21 recites "one or more halogens combined with a Group V or Group VI element," and independent claim 43 recites "one or more of thionyl bromide, sulfuryl bromide, phosphorus tribromide, phosphorus

oxybromide, hypobromous acid, and bromine in nonaqueous solutions for ash-containing sorbent regeneration."

The applicants disclosure teaches the use of an acid comprising, for example, a hydrohalide acid or a halide salt solution. One reason for using these solutions is that not only does the halide ion exchange out the sulfate ions that poison the sorbent, it also regenerates the most active form of the sorbent; that is, one where the cationic carbon is associated with a halide anion. This structure optimizes the oxidation reaction rate, and the halide provides a stable binding partner for mercury on the sorbent surface, which the sulfate or nitrate does not. Thus, in contrast to Pahlman, nitric acid would be less effective for washing, since although it can exchange out sulfate, it does not provide the preferred active site for Hg binding. Also, in contrast to Pahlman's metal oxides, none of the sorbent matrix dissolves. There is no need to dissolve out a metal sulfate, such as that formed in the Pahlman sorbent.

For at least these reasons, applicants assert that independent claims 1, 21, 27, 37, 43, and 56 are allowable over the cited prior art. It is, therefore, also believed that the claims dependent from the independent claims are allowable over the cited prior art.

It is respectfully submitted that all claims are patentable over the cited prior art. It is furthermore respectfully submitted that all other matters have been addressed and remedied and that the application is in form for allowance. Should there remain unresolved issues that require adverse action, it is respectfully requested that the Examiner telephone Bruce A. Johnson, Applicants Attorney at 512-301-9900 so that such issues may be resolved as expeditiously as possible. Charge any additional fee(s) or underpayments of fee(s) under 37 CFR 1.16 and 1.17 to

deposit account number 50-3864 (Johnson & Associates).

2/8/10  
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Respectfully Submitted,

A handwritten signature in black ink, appearing to read 'Bruce A. Johnson', written over a horizontal line.

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